UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,956	10/27/2000	Daniel E. Fisher	001.00001	3189

7590 02/02/2004

Daniel E Fisher
2708 Shanandale Drive
Silver Spring, MD 20904

EXAMINER	
CHOW, CHARLES CHIANG	
ART UNIT	**PAPER NUMBER**
2685	10

DATE MAILED: 02/02/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/696,956	FISHER, DANIEL E.	
	Examiner	Art Unit	
	Charles Chow	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *3-5,18 and 19* is/are allowed.

6)☒ Claim(s) *1,2,6,8-17,20 and 21* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Office Action for Amendment (11/05/2003)

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 16 is rejected under 35 U.S.C. 102(b) as being anticipated by Cash (US 4,509,052).

Regarding **claim 16**, Cash teaches a rf bridge interferometer receiver (abstract, Fig. 2) having processor 34 (Fig. 2) coupled to the third frequency converter 24, 26 (Fig. 2) with first and second frequency converters 10/12, 12.14, for measuring elevation angle, azimuth angle, and range (abstract, summary of invention, his claims 1, 10). Cash teaches the capturing of the frequency difference using phase detectors 24/26 and processor 34 to analyze frequency difference according to equations (col. 7, lines 3-24).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 6, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone et al. (US 3,680,124) in view of Puzzo (US 5,255,000).

Regarding **claim 1**, Stone et al. (" Stone") teaches a receiver (figure in cover page, inside the

dotted line) comprising RF bridge coupled to dicriminator 99 (figure in cover page) to receive reference signals, 340MC+250-f and 340MC-f, from frequency synthesizer 69 (Fig. 7), to mixers 65/67, for computing the phase difference of the received signals A1, A2, emitted from satellite (abstract, figure in cover page; col. 6, line 63 to col. 7, line 18).

Stone teaches the first and second frequency converters (mixers 65 and mixer 67as shown in Fig. 7).

Stone teaches the third frequency converter (linear mixer 71, Fig. 7) coupled to outputs of the first and second frequency converters (mixers 65/67 above).

Stone taught above the frequency difference modulated onto to the reference signal, Stone taught the phase comparator 101 (Fig. 7) connected to 200KC IF 83 for modulating the 100KC VCO 105 (Fig. 7; col. 10, lines 50-68; col. 14, lines 19-48) for the frequency synthesizer 69.

Stone does not clearly teach the processor.

Puzzo teaches the processor 84 (Fig. 2; col. 5, lines 19-21) for computing the angle of arrival of the pair of transmission signals using the phase differences from the means for determining the frequencies of the transmission signals and the phase correlating (col. 10, lines 30-34). Puzzo teaches a technique to avoid the common weakness such that the angle of arrival of the signal can be truly measured (col. 1, lines 19-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone, and to include Puzzo's processor for measurement of angle of arrival and frequencies, such that the accurate angle of arrival of a transmitted signal could be computed.

Regarding **claim 6**, Stone has taught third frequency converter 71 to the first and second frequency converters 65/67, for measuring of the difference information received from antennas A1-A2. Stone taught above the frequency difference modulated onto to the reference signal, Stone taught above the phase comparator 101 (Fig. 7) connected to 200KC IF 83 for modulating the 100KC VCO 105 (Fig. 7; col. 10, lines 50-68; col. 14, lines 19-48) for the frequency synthesizer 69. Puzzo has taught above the processor for processing correlated signals from two antenna for the direction finding with reference signal.

Regarding **claim 21**, Stone has taught third frequency converter 71 to the first and second frequency converters 65/67, for measuring of the difference information received from antennas A1-A2. Stone taught above the frequency difference modulated onto to the reference signal, Stone taught above the phase comparator 101 (Fig. 7) connected to 200KC IF 83 for modulating the 100KC VCO 105 (Fig. 7; col. 10, lines 50-68; col. 14, lines 19-48) for the frequency synthesizer 69. Puzzo has taught above the processor for correlating signals from two antenna for the direction finding with reference signal.

2. Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Puzzo, and further in view of Wachs (US 6,147,640).

Regarding **claim 2**, Stone and Puzzo do not clearly teach the frequency difference being a difference between frequency of the first and second signals, although Stone taught above the frequency difference modulated onto to the reference signal, Stone taught above the phase

comparator 101 (Fig. 7) connected to 200KC IF 83 for modulating the 100KC VCO 105 (Fig. 7; col. 10, lines 50-68; col. 14, lines 19-48) for the frequency synthesizer 69. Wachs teaches the system for determining the location and angle of arrival of a interference signal for a communication satellite (title, abstract, figure in cover page, Fig. 4; col. 1, lines 6-12; col. 2, lines 10-60). Wachs teaches the determining of frequency difference for calculating the phase shift (as shown in col. 4, lines 16-46). Wachs teaches the efficient technique for locating a signal source by calculating of the angle of arrival, such that the emitting source can be located. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Wachs 's determining of the frequency difference for angle of arrival, such that the system could efficiently locate the signal source. Stone has taught above the first and second frequency converters for receiving signals from respective first and second antennas, and the third frequency converter..

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Puzzo, and further in view of Kitayoshi (6,140,960).

Regarding **claim 8**, Stone has taught above the first, second, third converter. Kitayoshi teaches the band pass filter 222/223 coupled to converter (Fig. 12, col. 20, lines 37-62). Kitayoshi teaches the efficient estimating of the direction of a wave source for generating radio wave hologram observation and display (as shown in title, abstract, col. 1, lines 11-27, col. 19, line 66 to col. 20, line 36). Kitayoshi teaches the efficient estimating of a radio

source such that the size of the emitting signal source can be accurately estimated (col. 6, line 45-51). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Kitayoshi's band pass filters, such that the system could efficiently estimate the size of the emitting source accurately.

4. Claims 9-11, 14-15, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cash in view of Adams et al. (US 4,717,916).

In the above, it does not clearly teach the digital frequency source.

Regarding **claim 9**, Adams et al. (also as Adams in below) teaches the digital source to generate a reference signal based on the signal from a clock source and the reference being coupled to the RF bridge, the G(t) 368 signal from processor 370 (Fig. 26-27) for the high resolution Doppler interferometer (abstract, col. 1, lines 6-10; col. 5, line 50 to col. 6, line 52; col. 36, lines 25-49). Adams teaches the technique for the locating a target with the high resolution image (col. 5, lines 43-57), such that the target can be located accurately. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Cash above, and to include Adams's G(t) correction signal for locating a target, such that target can be accurately located.

In the above, it does not clearly indicate the second center frequency of the second fourier transformer.

Regarding **claim 10**, Adams et al. (" Adams") teaches the second fourier transformation using the window function multiplier WFM for signals (xB1-yB2) from receiver B 340 and the antenna B 334 (figure in cover page), other than the first fourier transformation of the signals from receiver A 338. Adams teaches the fourier transformation for signals xB1-yB2 having a corresponding second center frequencies, fB1/fB2 (figure in cover page). Adams teaches the high resolution target source locating and interferometer (abstract), such that the target can be accurately located. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Cash above, and to include Adams' second window function multiplier, such that the target could be accurately located.

Regarding **claim 11**, Adams taught above for: the digital frequency generator G(t) for the first digital signal (fA1/fA2 at receiver A output, figure in cover page, and corresponding description in specifications) at first center frequency, coupled to the first fourier transformation using WFM (figure in cover page); and second digital signal (fB1/fB2 at receiver B, figure in cover page) at second center frequency, coupled to the second fourier transformation using another WFM (figure in cover page).

Regarding **claim 14**, Cash taught the first and second frequency converter; the third frequency converter coupled to the first and second RF frequency converters.

Regarding **claim 15**, Cash taught above the first and second frequency converter; the third RF frequency converter; the frequency difference signal.

Regarding **claim 17**, Adams ahs taught above in claim 10 the step of analyzing by forming a first fourier transform and second fourier transform.

5. Claims 12-13, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cash in view of Adams, as applied to claim 10 above, and further in view of Maitre (US 4,903,030).

In the above, it does not clearly teach the frequency discriminator coupled to the fourier transformer.

Regarding **claim 12**, Maitre teaches the frequency discriminator 27 (figure in cover page) is coupled to the frequency analysis 26 (figure in cover page), for the detecting of angular discrimination of targets by airborne radar (abstract; Fig. 1-3; col. 1, line 11 to col. 24). Maitre teaches the Doppler frequencies can be selected with extreme precision for the very fine angular discrimination (col. 1, lines 41-45), such the angle of signal arrival from target can be very finely measured. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Cash above, and to include Maitre' discrimintor coupled to frequency analysis, such that the angle of signal arrival could be accurately measured. Regarding the first and second fourier transformation, referring to Adams above.

Regarding **claim 13**, Adams taught above the circuitry to detect including fourier transformers; Cash taught above the digital frequency generator further generates a third digital signal, to cause frequency shift.

Regarding **claim 20**, Cash has taught above the range determination from Doppler counter 28 (col. 4, line 57 to col. 5, line 2).

Claims Objection

6. Claims 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim

and any intervening claims.

Claims allowable

7. Claims 3-5, 18-19 are allowable over the prior art of record.

The following is the examiner's statement for the reasons of allowance:

Applicant has amended independent claims 3, 5, 18 to including the allowable subject matter for the fourth frequency converter in claim 3, the up converter/down converter coupled to the RF bridge and processor in claim 5, the first, second fourier transform center frequencies in claim 18. The dependent claims 4,19 are also allowable due to their dependency upon the independent claims above.

The closest prior art to Stone teaches the determining of the azimuth information from the signal difference from the two antennas A1-A2. Stone teaches the third frequency converter 71 coupled to the first, second frequency converter 65/67. Stone does not teach the fourth frequency converter, the additional up converter/down converter coupled to the RF bridge and processor having first, second fourier transform center frequencies.

Any comments considered necessary by applicant must be submitter no later than the payment of the issue fee, and to avoid processing delays, should preferably accompany the issue fee. Such submission should be clearly labeled "comments on statement of reasons for allowance".

Response to Arguments

8. Applicant's arguments with respect to claim 1-2, 6, 8-17, 20-21 have been considered but are moot in view of the new ground(s) of rejection.

Regarding applicant's argument based upon the no teachings for the RF bridge having the

first and second converters coupled to respective antennas, and the third converter coupled to the outputs of the first and second converters, Stone has taught third frequency converter 71 to the first and second frequency converters 65/67, for measuring of the difference information received from antennas A1-A2. Puzzo has taught the processor for processing correlated signals from two antenna for the direction finding.

In view of disclosures, claims 1-2, 6, 8-17, 20-21 are remaining in the rejection manner.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (703)-306-5615.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban, can be reached at (703)-305-4385.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9306 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Charles Chow C.C.

January 6, 2004.

EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600